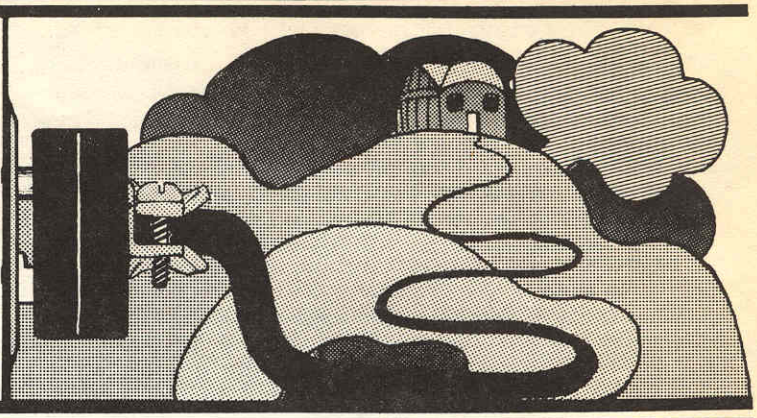
L. SHUSTEK

NEWSLETTER Homebrew Computer Club



6800 Complete Home Study Course News Release

San Diego — Electronic Product Associates, Inc., 1157 Vega Street, San Diego, CA 92110, 714-276-8911, announces with the purchase of a basic Micro-68a you receive the complete home study course including Users Manual, 15 chapter Lab Manual, Understanding Microprocessors, M6800 Design Manual, the Motorola Programming Manual and the Instruction Summary Card.

With the above mentioned items you will be on your way to becoming one of the few experts in Microprocessing. Total cost is $544.50. •

SOFTWARE STANDARDS — Who Needs Them? by Tom Pittman

Any time someone gets up the energy to spend some effort on standardization, opinion polarizes. On the one hand we hear cheers and encouragement and on the other hand boos and discouragement. Since I am sitting on a Standards committee, you know how I feel. Let me therefore answer the detractors of standardization in general, and of software standards in particular.

The first argument raised against standards is, "They will inhibit progress." That may be true. Standards certainly slow down the proliferation of different ways of doing things. Some of those different ways are indeed beneficial and good; most of them are merely different. I suppose it is true that the larger the number of different ways there are for doing hings, the more chance there is that a better way (or at least the better for any one particular application) is represented among them. At the same time the chance is reduced that any one of those ways is sufficiently developed to be of any use. This is because the total development effort is dissipated over too many different thrusts. We can see what software standards have done in the past: FORTRAN is such a standard, and because it is so, virtually every mainframe manufactured in the country is obliged to supply a FORTRAN compiler. The language is usable, its problems are well known, and those who need a language as a tool can generally depend on (mostly) predictable results when they use the ANS version of the language. Because there is widespread agreement among language designers that FORTRAN is a crummy language, each of them is designing another, better, language. We have dozens of the languages and they are all beter than FORTRAN. None of them are very useful though, because they lack the widespread support accorded to a *standard* language. I claim there is no reason to suppose that software standards in the future will be any different. Standards do not inhibit progress so much as they make the results of that progress available to the users.

The next argument reminds us that all microscopes are different and insists that the incompatibilities make standards either meaningless or impossible. I will admit to incompatibilities in the different CPUs, but among the most popular of them, I think the similarities outweigh the differences, at least in the areas we have chosen to standardize. To be sure, there are processors which will have a great deal of difficulty fitting into any standard we come up with; you may note, however, that virtually all of these have no second source. I suggest this as evidence that there is a consensus of what a microprocessor should be like, and that the codification of that consensus is our standard. But the world in which we work will admit to a stronger response than that. Not only is it meaningful to speak of standards across microprocessor lines, but there is a whole family of microprocessors which execute substantially the same instruction set; they are incorporated into systems by seven different chip manufacturers and dozens of OEMs, yet almost universally software developed on one of these systems cannot be loaded into

cont. pg. 2

another. The users cannot go out and buy package software (not even source code!) and expect to use it without significant modification. Standards among large computers are those defined by the manufacturer, because there are no others; the users benefit from the availability of software from independent vendors because there is no compatibility problem. If we had the same uniformity in our software we could quit standing on each other's toes.

Our standards committee has selected two general areas of immediate value for standards work. One of these deals with relocatable code format. There is no valid reason why we cannot come up with a standard which is applicable to all 8080-class CPUs (i.e. 8080, 8085, Z80), when dealing with object modules generated by an assembler or a FORTRAN compiler. No doubt there are many features which modern languages and/or debugging aids would like to see in a loader (using information passed from the compiler). Some of these are probably totally impractical in the general sense which we need to keep our focus; many can be supported by permission (as opposed to by requirement). Thus we retain the "standard" format as a subset of the enhanced form which supports all the goodies, just as nearly every FORTRAN compiler supports features which extend the ANS standards.

It is true that by the time our standards are adopted there will already exist a substantial amount of imcompatible software. This is unfortunate and only serves to underscore the need to avoid fruitless delay. However, once the standards are adopted, there will be a great incentive to develop new software products in accordance with the standards, and I think it reasonable to believe that the conversion of existing software to conform will be less effort than might be expected from a complete remake. The burden is on us as standards makers, to build into them the flexibility for needed growth into the forseeable future. I do not see this to be impossibly difficult for the definition of relocatable code.

The other software area of immediate concern is much more controversial: assembly language code. There is obviously no way we can define a standard assembly language which encompasses all microprocessors. We can, however, agree on a standard syntax for a macro assembler. We can define a standard representation for the common addressing modes, and suggest guidelines for the incorporation of unusual addressing modes. We can even suggest guidelines for the naming of instruction mnemonics. Thus where two different processors each have an instruction which performs substantially the same function in their respective repertoires, a user can expect to use the same name. Clearly this does not apply to widely differing functions, but my experience is that the similarities outweigh the differences.

Ben Franklin once said, "We must all hang together, or surely we shall all hang separately." I think the wisdom of this aphorism can be applied directly to our own work. •

ADDENDUM:

After four months of meetings, the IEEE microprocessor standards effort is beginning to show some progress. The greatest concentration of talent, energy, and warm bodies continues to be in the hardware area, dealing with bus specifications. So far this is still in the fact-finding stage, but we have heard presentations on the S-100, SBC-80, and PI busses. A major problem area in the S-100 bus definition lies in the specification of DMA protocol; this is on the agenda for next month.

In the software area, we have heard presentations on the Intel floating point format and a first draft of a mnemonic standard. We are still attempting to get better support for the work on relocatable code.

One of the continuing problems in every specialty area of this effort is the turnover rate of participants. As new people come to the successive meetings, they often bring specific objections to the standardization efforts which have already been discussed in previous meetings; reopening the discussion each month only wastes valuable meeting time. I have responded to some of the objections in the software area in the essay titled, "Software Standards – Who Needs Them?" The objections raised with respect to bus standards are often very similar. I say, "Work with us or stay home." •

Western Easters by Lichen Wang

My wife asked me one day: "When is Easter next year?" Without a 1978 calendar, I said: "It is the first Sunday after the first full moon after March 21." She said: "You speak Greek when you don't know the answer." A little embarrassed, I went to do some research and found a lot of interesting stuff.

There are many indications that the sole important application of arithmetic in Europe during the Middle Ages was the calculation of Easter date. Imagine if they had home computers at that time. Instead of playing Star Trek, every computer hobbyist would be calculating their Easters!

Anyway, there are about 365.242 days in a solar year, and about 29.531 days in a lunar month. Thus 19 solar years come out very close to 235 lunar months. This is called the Metonic cycle. If you label the years cyclically from 1 through

Robert Reiling. . . . . Editor-in-Chief
Joel Miller . . . . . Managing Editor
Brent Sack . . . . . Graphics

The NEWSLETTER is published regularly by the
Homebrew Computer Club.
P.O. Box 626, Mountain View, CA 94042

Vol. 2/Issue 21/November-December 1977

19 and back to 1 through 19 etc., you get the Golden numbers of the years. Years with the same Golden numbers will start with the same phases of the moon. However, this cycle is not exact, and in 25 centuries the phase of the moon as calculated from the Golden number will be off by about 8 days. Thus one needs a correction called the Clavian correction.

Now, since we want to celebrate our New Year's day at midnight, the calendar year has to be an integer number of days and not 365.242 days long. In 46 B.C., Julius Caesar established the 12-month year of 365 days with each 4th year having 366 days. This is called the Julian calendar and averaged 365.250 days per year. This worked for quite a while, but by the end of the 16th century, the discrepancy between 365.242 and 365.250 accumulated into 10 days and New Year's day was drifting toward Spring. Pope Gregory XIII decided to chop off those 10 days and modify the Julian calendar. The new scheme was, we have a leap year every 4 years, — except that we delete one leap year every century, — except that we do not delete the leap year every 4 centuries. (How simple!)

The Gregorian calendar went into use at different dates in different parts of Europe. If you think crossing the International Date Line is confusing, think about the travelers in Europe in those days. One of them checked into a little inn in Spain on Thursday October 4, 1582 and the next day the innkeeper charged him for 11 days because it was Friday October 15th by then. Travelers in Rome and Portugal might have the same luck on that day. But if they went to France (they almost certainly would arrive there a few days before they departed) they got ripped off again two months later. The Catholic states of Germany changed over in 1583, and the Protestant states of Germany waited until 1700. Just like the change over to the metric system, England waited and waited, it was 170 years later (1752) that England joined the rest of the Western Europe. They had to lose 11 days instead of 10 days because by then the Julian calendar had gained another day.

America unfortunately was still one of the English colonies and had to change over in 1752. Otherwise the Gregorian calendar would have been sitting in our Congress subcommittee (together with the metric system), and we could laugh our heads off watching the Concordes taking 13 days to fly back to London.

Back to our calculations of Easter: Armed with the Golden numbers, the Gregorian correction and the Clavian correction, we can compute the epact — the age of the calendar moon at the beginning of a year. And after that, it is a piece of cake to find the first Sunday! It is well known that Sunday comes every 7 days exactly (no decimal point for a change).

The following is a program coded in Palo Alto Tiny Basic to print out Easter Sundays from 1978 to 2001. It can be easily changed to print Easter of any year between 464 A.D. and 32767, — unless they change to Stardates by that time. It should also be easy to translate this into other versions of Basic (I hope). And using epact, I think you can compute Chinese New Year's day and other lunar calendars without too much trouble. •

```
100 REM   Western  Easters of Year 1978 through 2001
102 REM         Coded in Palo Alto Tiny Basic
104 REM                 by Lichen Wang
106 REM
110 PRINT "Easter Sundays:"
120 FOR Y=1978 TO 2001
130 GOSUB 210
140 IF M=3 PRINT "March",
150 IF M=4 PRINT "April",
160 PRINT #3, N, ", ", Y
170 NEXT Y
180 STOP
190 REM
192 REM  This subroutine is based on the algorithm quoted in
194 REM   Knuth, D.E.: "The Art of of Computer Programming"
196 REM           Vol.1, pp. 155-156, Wesley, 1968
198 REM
200 REM    Given a year Y (where:  463 < Y < 32768), this
202 REM      subroutine finds the month M and the date N
204 REM      of Easter Sunday for most Western churches.
208 REM
210 G=Y-Y/19*19+1; REM  . .   . . . . . Golden number
220 IF Y<1583 GOTO 350
230 C=Y/100+1; REM  . . . . . Century
240 X=3*C/4-12; REM . . . . . Gregorian correction
250 Z=(8*C+5)/25-5; REM . . . . . Clavian correction
260 D=5*Y/4-X-10; REM . . . . . Extra days
270 E=11*G+20+Z-X; REM  . . . . . Epact
280 E=E-E/30*30
290 IF E<=0 LET E=E+30
300 IF (E=25)*(G>11)+(E=24) LET E=E+1
310 N=44-E; IF N<21 LET N=N+30; REM . . . Full moon
320 N=7-D+(D+N)/7*7; REM  . . . . . Advance to Sunday
330 M=3; IF N>31 LET M=4, N=N-31; REM . . Get month
340 RETURN
350 IF Y<464 PRINT "I don't know"; STOP
360 D=5*Y/4; REM  . . . . . Julian extra days
370 E=11*G-4; REM . . . . . Epact
380 E=E-E/30*30+1
390 GOTO 310
```

Computer Stores by Robert Reiling

Each computer store is a little bit different and usually offers a good variety of products and publications that will interest the computer hobbyist. The computer professional, in many cases, will be delighted with the wide variety of offerings available right on the dealer's shelf. (No purchase orders to write, no request for quotations, no telephone calls to survey the market, etc. that seem to be the way of life in the usual "big company" operation.) Here are examples of retail outlets that will give you an idea of what is available.

DIGITAL DELI, 80 W. El Camino Real, Mountain View, CA 94040. Gerald Wright is the proprietor of this store which specializes in systems and in materials for education. The store occupies about 2000 square feet of floor space and has convenient parking off the street adjacent to the store. A good line of products including PTC, E&L, and OK Products to name a few. Gerald is particularly interested in business systems and has development work underway on applications programs. Computer oriented books and magazines are, of course, available. Visit with Gerald while in the store and you will surely expand your knowledge of small computer stores.

ANCHOR ELECTRONICS, 2102A Walsh Avenue, Santa Clara, CA 95050. "Old Timers" will remember this location as the home of Solid State Music. Anchor is now the retail outlet for the products that are produced and distributed by Solid State Music to OEM and other store accounts. Anchor Electronics is my favorite store for ICs and parts needed for building my projects. The inventory is huge and priced properly. I like to use the will call service which really is a time saver; just telephone your order in advance, stop briefly to pay the bill and pick up the order and be on your way. Ask about specials on S-100 boards if your computer uses them. Sometimes boards with minor flaws are being sold at reduced prices. Recently the board maker used green circuit board material instead of blue as is specified for all Solid State Music boards. The board maker's mistake became the hobbyist's windfall. John Burgoon is the founder of this organization. You will often find him checking off the inventory and helping with customers' orders. John has created a remarkable store that probably is not duplicated anyplace in the world in so far as having a readily available parts stock for the hobbyist. Complete S-100 boards, blue boards that is, are offered in a wide selection too.

OMAHA COMPUTER STORE, 4540 South 84th Street, Omaha, NE 68127. Another fine computer store located in mid America a long way from silicon valley. Jerry Greelis is the founder of this store devoted to hobbyist computers. Being in the agricultural section of the country, Jerry is looking for programs that are particularly suited to agricultural uses. I am surprised that no programs or systems devoted to such uses have not been described at the Homebrew Computer Club meetings because Santa Clara County is a major agricultural area as well as silicon chip producer. Can anyone turn up some ideas? Jerry would be interested and so would readers of the Newsletter. The Omaha store has a very complete line of products and demonstration set ups. Also offered is a repair bench and help with repair work. You can bring your system in and get it up and running.

Here then is a sample of different retail outlets each with a little different service for the computer person. Is there a store that you like? Why not tell us about it with a brief input to the Newsletter. •

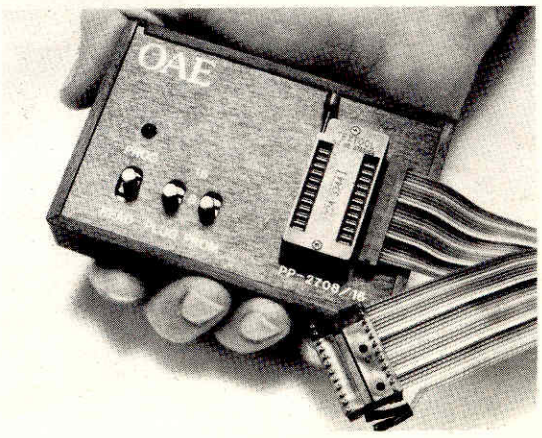
PP-2708/16 Prom Programmer — News Release

There is a new force in PROM programming! the company that brought you the *first* low cost/high speed paper tape reader now has a new low cost series of piggyback PROM programmers. For example, the PP-2708/16 PROM Programmer plugs directly into any 2708 or TMS-2716 memory socket. The PROM to be programmed is placed in the zero insertion force socket and the data is dumped over the 8 lower address lines using OAE's proprietary interface technique (pats. pending). No additional power supplies are required and all timing and control sequences are handled by the programmer. Because of this simple interfacing technique only a short software routine is required to give you the power of even the most expensive programmers. In addition, multiple programmers may be connected in parallel for gang programming.

Each unit comes complete with a DC to DC switching regulator, 10 turn cermet trimmers for precise voltage and pulse width alignment, and a zero insertion force socket. The unit is packaged in a handsome black anodized aluminum case for table top operation. A 5 foot flat ribbon cable interconnects the programmer with the read only PROM socket via a 24 pin plug.

Kit $249.00
Assembled, Tested and Aligned. $295.00*

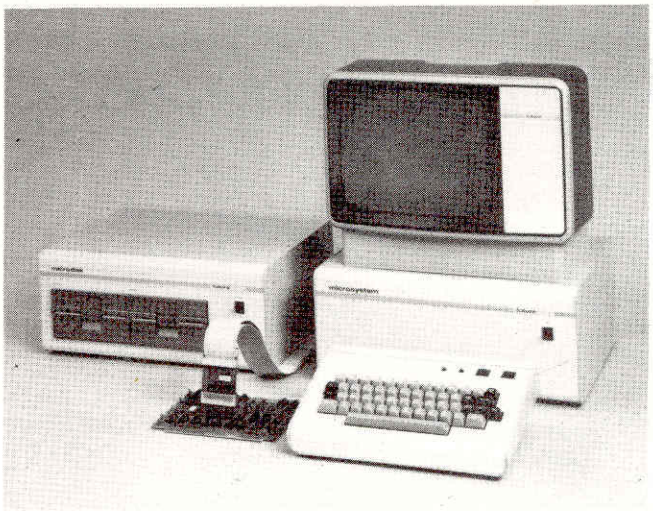
*For a limited time OAE is shipping the Assembled, Tested and Aligned unit for the Kit price! •



Z-80 Based Product Development Systems Available From Futuredata News Release

October 31, 1977, Los Angeles, California — Futuredata Computer Corporation (formerly Microkit, Inc.) manufacturers of universal microcomputer product development systems, has announced availability of four Z-80 based systems.

MICROSYSTEM/12, MICROSYSTEM/15 (tape-based), MICROSYSTEM/20 and MICROSYSTEM/30 (disk-based)



Z-80 systems include CPU with up to 56K memory, high speed 960 character CRT, ASCII keyboard, dual floppy disk or cassette tape unit, operating system software and documentation. Optional accessories and software include in-circuit emulator, line printers, extended BASIC, BASIC compiler, RDOS (disk operating system with relocatable macro assembler and linkage editor), and word processor. Low cost plug-in modules permit the systems to be converted to 8080 or 6800 processors.

System features include two RS-232 serial ports, 8-bit parallel TTL I/O port, real-time clock, bootstrap in PROM, memory write-protect under software control, 8-level vectored interrupts, DMA capability and complete disk and tape operating systems with monitor, debugger, editor, assembler and copy utility.

Delivery for all systems is 2 to 4 weeks. For additional information contact Futuredata Computer Corporation, 11205 So. La Cienega Blvd., Los Angeles, California 90045. Phone: (213) 641-7700. TWX: 910-328-7202. Sales contact: R. Schaaf. •

RCA Cosmac Micromonitor CDP 18S030 Provides Real-Time In-Circuit Hardware & Software Debugging Of CDP 1802 Micro-processor Systems — News Release

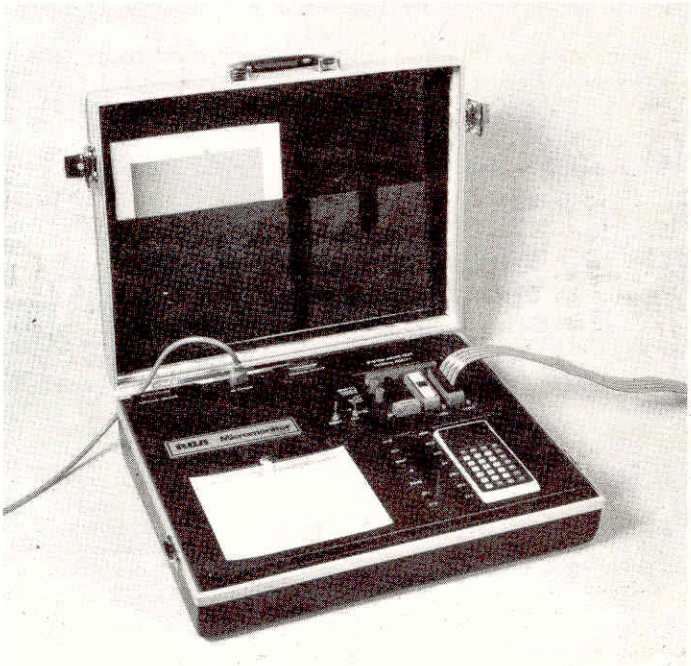
Somerville, N.J. — A powerful new debugging tool, the COSMAC Micromonitor, CDP18S030, permitting in-circuit debugging of any CDP1802 microprocessor system hardware and software in real time, is now available from RCA Solid State Division.

Completely self-contained in an attache case, the Micromonitor is a useful field-service tool, a flexible production tester, and a valuable prototyping adjunct. It includes a built-in keyboard, display, and status indicator lights, as well as software debugging routines. A special feature is a self-test card which simulates a user system to allow verification and assurance of Micromonitor operation.

By means of a single cable connection, the Micromonitor can be interposed between the CPU of a system under test and all the CPU interfaces, giving the user direct control of both the hardware interfaces and program execution. Controlled by its own built-in microprocessor, the Micromonitor uses the CDP1802 CPU, power supply, clock, memory, etc. of the system under test to run a user program. It does not emulate the system but gives a reliable measure of true system performance.

Operation, installation, and application information is provided in the *Instruction Manual for the RCA COSMAC Micromonitor CDP18S030,* MPM-218, and is included with the instrument.

In single quantities, the RCA COSMAC Micromonitor, CDP18S030, is priced at $1600 (domestic). Further information and copies of the Product Description, PD18, for the new COSMAC Micromonitor CDP18S030 may be obtained from RCA Solid State Division, Box 3200, Somerville, New Jersey 08876. •



The VDB (Video Display Board) News Release

Technical Design Labs has introduced the VDB (Video Display Board), a video interface for the S-100 Bus microcomputers.

The VDB is low in cost and yet provides the capabilities of video terminals costing thousands of dollars more. It consists of two boards, one piggybacked to the other. The unit occupies one edge connector on the bus, but takes up the space of two boards.

The VDB contains its own display buffer memory and provides two pages of display, each with 25 rows of 80 characters. The display buffer memory does not use any memory address, thus leaving the entire computer memory address intact for user programs.

This new product displays, in addition to the 96 upper and lower case ASCII characters with descenders, 64 unique display symbols, thus permitting a graphic resolution with 160 horizontal elements by 75 vertical elements. The display can accept data at a 400,000 character per second rate.

The VDB provides a true hardware blinking cursor to facilitate the programming of special edit functions. It is addressable and indicates on the display screen the physical location where the next symbol will be written into or read from.

A mode register allows any combination of characters to blink, insert or do both independently. Cursor and display may also be inhibited under mode register control.

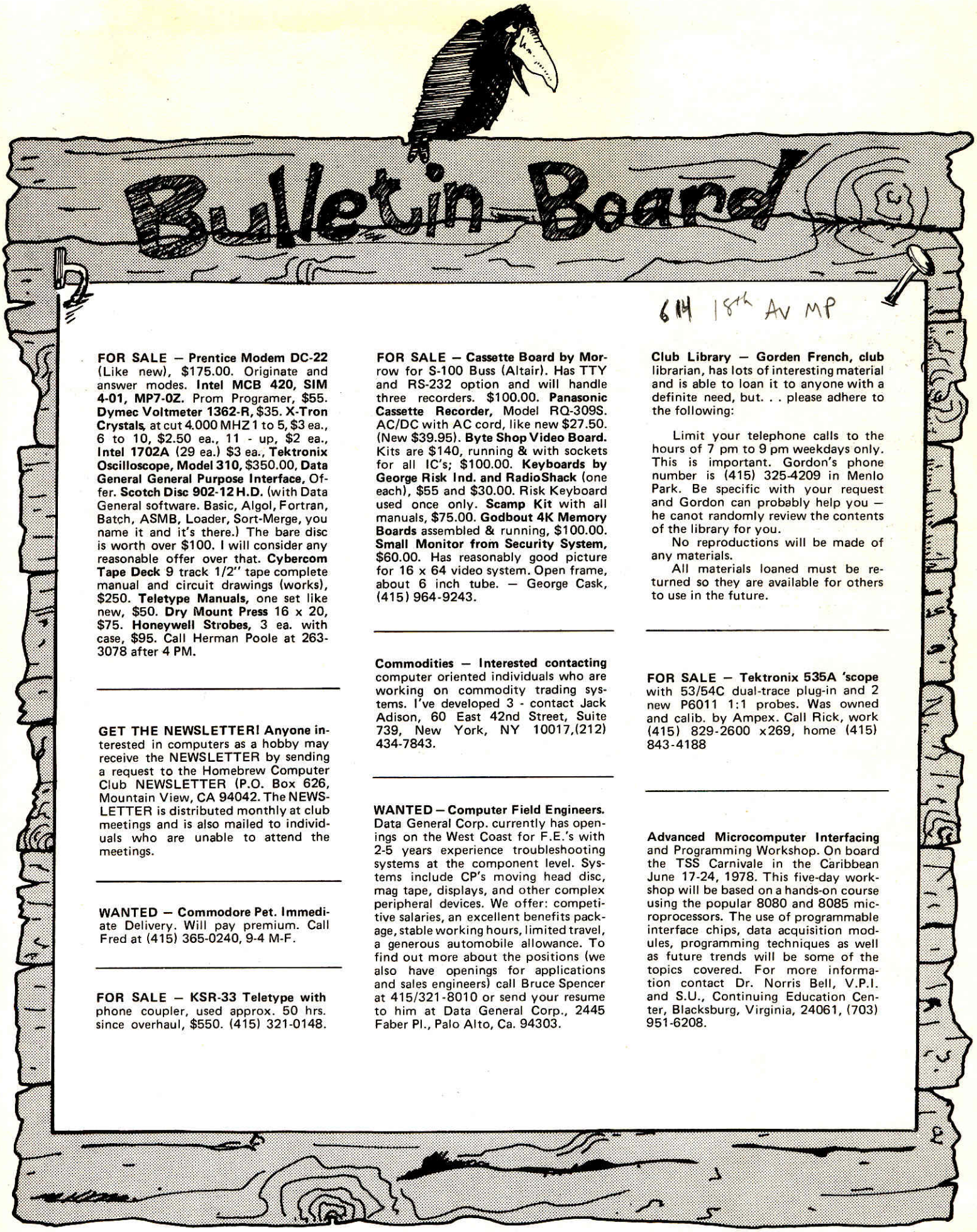
The VDB works with either modified TV set or monitor and has an on-board 8 bit parallel keyboard port with status strobes. The VDB requires one motherboard socket and occupies two card spaces.

The VDB is priced at $349 in kit form and $449 when assembled and tested. Software character and graphics output drivers for Z80* and 8080 systems are supplied. These drivers are ROMable.

For additional information, contact Donna Galletti, Director of Sales, Research Park, Building H, 1101 State Road, Princeton, New Jersey 08540 (609) 921-0321. •

*Z80 is a registered trademark of Zilog.

```
LIST
0001 * BY JUAN RIVERA
0002 *     354 MARSHALL DRIVE
0003 *     WALNUT CREEK,CA. 94598
0004 ********************************************
0005 * THIS ROUTINE ALLOWS BOTH UPPER AND LOWER *
0006 * CASE OPERATION WITH UPPER CASE KEYBOARDS.*
0007 * 1) YOU MUST OF COURSE HAVE A DISPLAY     *
0008 *     DEVICE WHICH WILL DISPLAY BOTH CASES. *
0009 * 2) YOU MUST HAVE SENSE SWITCHES.         *
0010 *                                          *
0011 *     <*> SENSE SW 13 UP=LOWER CASE <*>    *
0012 *    <*> SENSE SW 13 DOWN=UPPER CASE <*>   *
0013 ********************************************
0014 *
0015 *              <*> INPUT KEYBOARD <*>
0016 INCHAR IN       STAT    INPUT STATUS
0017        ANI      DAV     DATA AVAILABLE?
0018        JZ       INCHAR   NO? THEN LOOP
0019        IN       KBD     INPUT KEYBOARD
0020        ANI      7FH     STRIP PARITY BIT
0021 *
0022 *            <*> IS IT A CHARACTER? <*>
0023        CPI      41H     TOO LOW?
0024        RC       .       YES?-RETURN
0025        CPI      5BH     TOO HIGH?
0026        RNC      .       YES?-RETURN
0027        MOV      B,A     JUST RIGHT! SAVE IN B
0028 *
0029 * <*> ADDING 20H TO UPPER CASE MAKES LOWER <*>
0030        IN       SENSE   INPUT SENSE SWITCHES
0031        ANI      20H     MASK SWITCH #13
0032        ADD      B       ADD TO KEYBOARD
0033        RET      .       RETURN
```



6th 18th Av MP

FOR SALE — Prentice Modem DC-22 (Like new), $175.00. Originate and answer modes. **Intel MCB 420, SIM 4-01, MP7-0Z.** Prom Programer, $55. **Dymec Voltmeter 1362-R,** $35. **X-Tron Crystals,** at cut 4.000 MHZ 1 to 5, $3 ea., 6 to 10, $2.50 ea., 11 - up, $2 ea., **Intel 1702A** (29 ea.) $3 ea., **Tektronix Oscilloscope, Model 310,** $350.00, **Data General General Purpose Interface,** Offer. **Scotch Disc 902-12 H.D.** (with Data General software. Basic, Algol, Fortran, Batch, ASMB, Loader, Sort-Merge, you name it and it's there.) The bare disc is worth over $100. I will consider any reasonable offer over that. **Cybercom Tape Deck** 9 track 1/2" tape complete manual and circuit drawings (works), $250. **Teletype Manuals,** one set like new, $50. **Dry Mount Press** 16 x 20, $75. **Honeywell Strobes,** 3 ea. with case, $95. Call Herman Poole at 263-3078 after 4 PM.

GET THE NEWSLETTER! Anyone interested in computers as a hobby may receive the NEWSLETTER by sending a request to the Homebrew Computer Club NEWSLETTER (P.O. Box 626, Mountain View, CA 94042. The NEWSLETTER is distributed monthly at club meetings and is also mailed to individuals who are unable to attend the meetings.

WANTED — Commodore Pet. Immediate Delivery. Will pay premium. Call Fred at (415) 365-0240, 9-4 M-F.

FOR SALE — KSR-33 Teletype with phone coupler, used approx. 50 hrs. since overhaul, $550. (415) 321-0148.

FOR SALE — Cassette Board by Morrow for S-100 Buss (Altair). Has TTY and RS-232 option and will handle three recorders. $100.00. **Panasonic Cassette Recorder,** Model RQ-309S. AC/DC with AC cord, like new $27.50. (New $39.95). **Byte Shop Video Board.** Kits are $140, running & with sockets for all IC's; $100.00. **Keyboards by George Risk Ind. and RadioShack** (one each), $55 and $30.00. Risk Keyboard used once only. **Scamp Kit** with all manuals, $75.00. **Godbout 4K Memory Boards** assembled & running, $100.00. **Small Monitor from Security System,** $60.00. Has reasonably good picture for 16 x 64 video system. Open frame, about 6 inch tube. — George Cask, (415) 964-9243.

Commodities — Interested contacting computer oriented individuals who are working on commodity trading systems. I've developed 3 - contact Jack Adison, 60 East 42nd Street, Suite 739, New York, NY 10017,(212) 434-7843.

WANTED — Computer Field Engineers. Data General Corp. currently has openings on the West Coast for F.E.'s with 2-5 years experience troubleshooting systems at the component level. Systems include CP's moving head disc, mag tape, displays, and other complex peripheral devices. We offer: competitive salaries, an excellent benefits package, stable working hours, limited travel, a generous automobile allowance. To find out more about the positions (we also have openings for applications and sales engineers) call Bruce Spencer at 415/321-8010 or send your resume to him at Data General Corp., 2445 Faber Pl., Palo Alto, Ca. 94303.

Club Library — Gorden French, club librarian, has lots of interesting material and is able to loan it to anyone with a definite need, but. . . please adhere to the following:

Limit your telephone calls to the hours of 7 pm to 9 pm weekdays only. This is important. Gordon's phone number is (415) 325-4209 in Menlo Park. Be specific with your request and Gordon can probably help you — he canot randomly review the contents of the library for you.

No reproductions will be made of any materials.

All materials loaned must be returned so they are available for others to use in the future.

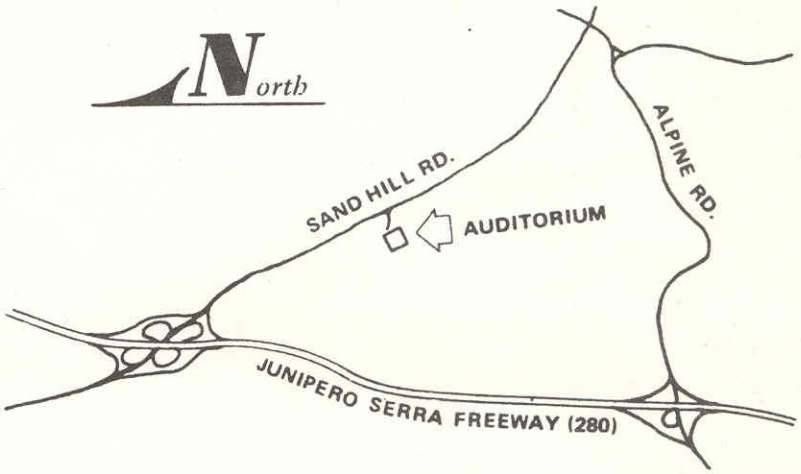
FOR SALE — Tektronix 535A 'scope with 53/54C dual-trace plug-in and 2 new P6011 1:1 probes. Was owned and calib. by Ampex. Call Rick, work (415) 829-2600 x269, home (415) 843-4188

Advanced Microcomputer Interfacing and Programming Workshop. On board the TSS Carnivale in the Caribbean June 17-24, 1978. This five-day workshop will be based on a hands-on course using the popular 8080 and 8085 microprocessors. The use of programmable interface chips, data acquisition modules, programming techniques as well as future trends will be some of the topics covered. For more information contact Dr. Norris Bell, V.P.I. and S.U., Continuing Education Center, Blacksburg, Virginia, 24061, (703) 951-6208.

In This Issue

Where And When Club Meetings

The Homebrew Computer Cub meets at the **Stanford Linear Accelerator Center Auditorium.** Dates scheduled for November are the 9th and 23rd, and for December the 7th and 21st. The dates and location are subject to change. However, if a change does occur, every effort will be made to provide advance notice in the *NEWSLETTER.*



Homebrew Computer Club NEWSLETTER

P.O. Box 626, Mountain View, CA 94042

first class